

Transistors

# 2.5V Drive Nch+Pch MOSFET

## US6M2

●Structure

Silicon N-channel MOSFET /  
Silicon P-channel MOSFET

●Features

- 1) Nch MOSFET and Pch MOSFET are put in TUMT6 package.
- 2) High-speed switching, low On-resistance.
- 3) Low voltage drive (2.5V drive).
- 4) Built-in G-S Protection Diode.

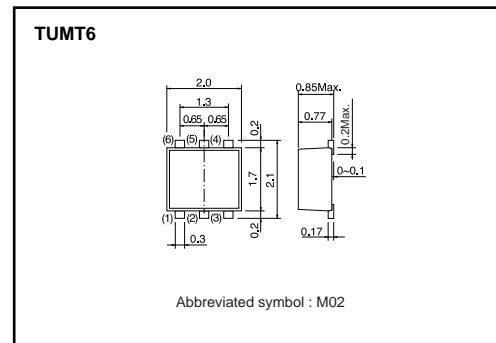
●Applications

Switching

●Packaging specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
US6M2		○

●Dimensions (Unit : mm)



●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits		Unit	
		Tr1 : Nchannel	Tr2 : Pchannel		
Drain-source voltage	V <sub>DSS</sub>	30	-20	V	
Gate-source voltage	V <sub>GSS</sub>	12	-12	V	
Drain current	Continuous	I <sub>D</sub>	±1.5	±1	A
	Pulsed	I <sub>DP</sub> *1	±6	±4	A
Source current (Body diode)	Continuous	I <sub>S</sub>	0.6	-0.4	A
	Pulsed	I <sub>SP</sub> *1	6	-4	A
Total power dissipation	P <sub>D</sub> *2	1.0		W / TOTAL	
		0.7		W / ELEMENT	
Channel temperature	T <sub>ch</sub>	150		°C	
Storage temperature	T <sub>stg</sub>	-55 to +150		°C	

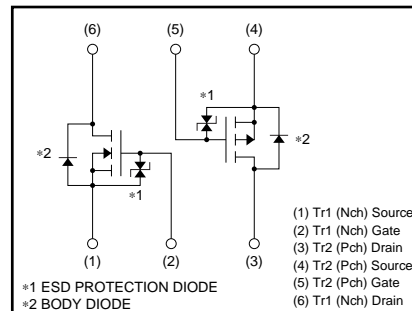
\*1 Pw≤10μs, Duty cycle≤1%  
\*2 Mounted on a ceramic board.

●Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to ambient	R <sub>th(ch-a)</sub> *	125	°C/W / TOTAL
		179	°C/W / ELEMENT

\* Mounted on a ceramic board

●Inner circuit



## Transistors

## N-ch

## ●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	$I_{GSS}$	–	–	10	$\mu A$	$V_{GS}=12V, V_{DS}=0V$
Drain-source breakdown voltage	$V_{(BR)DSS}$	30	–	–	V	$I_D=1mA, V_{GS}=0V$
Zero gate voltage drain current	$I_{DSS}$	–	–	1	$\mu A$	$V_{DS}=30V, V_{GS}=0V$
Gate threshold voltage	$V_{GS(th)}$	0.5	–	1.5	V	$V_{DS}=10V, I_D=1mA$
Static drain-source on-state resistance	$R_{DS(on)}$ *	–	170	240	$m\Omega$	$I_D=1.5A, V_{GS}=4.5V$
		–	180	250	$m\Omega$	$I_D=1.5A, V_{GS}=4V$
		–	240	340	$m\Omega$	$I_D=1.5A, V_{GS}=2.5V$
Forward transfer admittance	$ Y_{fs} $ *	1.5	–	–	S	$V_{DS}=10V, I_D=1.5A$
Input capacitance	$C_{iss}$	–	80	–	pF	$V_{DS}=10V$
Output capacitance	$C_{oss}$	–	13	–	pF	$V_{GS}=0V$
Reverse transfer capacitance	$C_{rss}$	–	12	–	pF	$f=1MHz$
Turn-on delay time	$t_{d(on)}$ *	–	7	–	ns	$V_{DD}\doteq 15V$
Rise time	$t_r$ *	–	9	–	ns	$I_D=0.75A$
Turn-off delay time	$t_{d(off)}$ *	–	15	–	ns	$V_{GS}=4.5V$
Fall time	$t_f$ *	–	6	–	ns	$R_L=20\Omega$
Total gate charge	$Q_g$ *	–	1.6	2.2	nC	$V_{DD}\doteq 15V, V_{GS}=4.5V$
Gate-source charge	$Q_{gs}$ *	–	0.5	–	nC	$I_D=1.5A$
Gate-drain charge	$Q_{gd}$ *	–	0.3	–	nC	$R_L=10\Omega, R_G=10\Omega$

\*Pulsed

## ●Body diode characteristics (Source-drain) (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	$V_{SD}$	–	–	1.2	V	$I_S=0.6A, V_{GS}=0V$

## Transistors

## P-ch

## ●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	$I_{GSS}$	–	–	10	$\mu A$	$V_{GS} = -12V, V_{DS} = 0V$
Drain-source breakdown voltage	$V_{(BR)DSS}$	-20	–	–	V	$I_D = -1mA, V_{GS} = 0V$
Zero gate voltage drain current	$I_{DSS}$	–	–	-1	$\mu A$	$V_{DS} = -20V, V_{GS} = 0V$
Gate threshold voltage	$V_{GS(th)}$	-0.7	–	-2.0	V	$V_{DS} = -10V, I_D = -1mA$
Static drain-source on-state resistance	$R_{DS(on)}$ *	–	280	390	m $\Omega$	$I_D = -1A, V_{GS} = -4.5V$
		–	310	430	m $\Omega$	$I_D = -1A, V_{GS} = -4V$
		–	570	800	m $\Omega$	$I_D = -0.5A, V_{GS} = -2.5V$
Forward transfer admittance	$ Y_{fs} $ *	0.7	–	–	S	$V_{DS} = -10V, I_D = -0.5A$
Input capacitance	$C_{iss}$	–	150	–	pF	$V_{DS} = -10V$
Output capacitance	$C_{oss}$	–	20	–	pF	$V_{GS} = 0V$
Reverse transfer capacitance	$C_{rss}$	–	20	–	pF	$f = 1MHz$
Turn-on delay time	$t_{d(on)}$ *	–	9	–	ns	$V_{DD} = -15V$
Rise time	$t_r$ *	–	8	–	ns	$I_D = -0.5A$
Turn-off delay time	$t_{d(off)}$ *	–	25	–	ns	$V_{GS} = -4.5V$
Fall time	$t_f$ *	–	10	–	ns	$R_L = 30\Omega$
Total gate charge	$Q_g$ *	–	2.1	–	nC	$V_{DD} = -15V, V_{GS} = -4.5V$
Gate-source charge	$Q_{gs}$ *	–	0.5	–	nC	$I_D = -1A$
Gate-drain charge	$Q_{gd}$ *	–	0.5	–	nC	$R_L = 15\Omega, R_G = 10\Omega$

\*Pulsed

## ●Body diode characteristics (Source-drain) (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	$V_{SD}$	–	–	-1.2	V	$I_S = -0.4A, V_{GS} = 0V$

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